Mumps Disease Plan

Disease and Epidemiology

Clinical Description:

Mumps is an acute viral disease, characterized by fever, swelling and tenderness in the salivary glands (parotid, sublingual, or submaxillary glands). Common complications include orchitis and testicular atrophy in postpubertal males. Mumps can also cause hearing loss (which may be permanent), pancreatitis, spontaneous abortion (in the first trimester of pregnancy) and meningitis/encephalitis. About one-third of clinical infections are subclinical.

Causative agent:

Mumps is caused by a paramyxovirus (an RNA virus). Other paramyxoviruses include parainfluenza, measles, respiratory syncytial virus, metapneumovirus, and Hendra and Nepah viruses. There is only one known serotype of mumps. This virus has a lipid envelope and is subject to disruption by typical cleaning agents (this means that it is easily inactivated, easy to disinfect).

Differential diagnosis:

Not all cases of parotitis (swollen lymph nodes) are mumps, but mumps is the only known cause of outbreaks of parotitis. Other causes of parotitis include CMV, parainfluenza, influenza A, coxsackievirus, lymphocytic choriomeningitis virus (LCM), enterovirus, HIV, Staphylococcus aureus, MOTT (mycobacteria other than TB), drug reactions and certain metabolic disorders (e.g., diabetes mellitus, cirrhosis, and malnutrition). Because clinical diagnosis of this disease may be unreliable, physicians should confirm all cases through laboratory tests.

Laboratory identification:

Because clinical diagnosis of mumps may be unreliable, cases of mumps should be laboratory confirmed. Laboratory testing, in conjunction with case investigations, can result in many suspected mumps cases being discarded. CDC strongly recommends that clinicians collect serum, buccal/throat swab, *and* urine samples from *all* suspect mumps cases.

Laboratory Methods

1. **IgM Serology** – Order IgM serology on all acute cases. But be aware that IgM serologies can be missing, delayed, or transient (meaning it could be falsely negative) if the patient was previously vaccinated. If IgM is positive, that confirms the illness. If IgM is negative, then consider performing a culture.
    - Specimen – serum
2. **IgG Serology** – A single IgG serology from an acutely ill patient is not diagnostic, and must be followed up with a second serology 2-4 weeks later. Mumps needs to be diagnosed in a timely manner, for this reason, we do not recommend IgG serology testing for acutely ill patients.

    - Specimen – serum
3. **Viral Culture** – Most sensitive between 1 and 4 days (but may be positive for up to 9 days) after the onset of parotitis. If the patient has previously received MMR vaccine, viral isolation is a good laboratory test to order.
    - Specimen – buccal/throat swab in viral transport medium, urine
4. **RT-PCR** – Detects viral RNA and provides epidemiologically important information. The interpretation of a positive RT-PCR result without demonstration of mumps growth in tissue culture must be interpreted carefully, particularly among persons whose symptoms do not meet the clinical definition of mumps.
    - Specimen – buccal/throat swab in viral transport medium, urine

Specimen Collection

- Buccal/throat swab:
    - The preferred specimen is buccal secretions. Massage the parotid gland area for about 30 seconds prior to collection of the buccal secretions near the upper rear molars.
    - Use a throat culture swab or plain Dacron or cotton-tipped swab.
    - A throat swab (oropharyngeal or nasopharyngeal) can also be collected.
    - The swab should be placed into 2-3 mls of viral transport medium (such as M4) or cell culture medium or sterile PBS.
- Urine:
    - Collect 5-10 mls of clean catch urine and store/transport in a sterile container.
    - Viral shedding in urine may occur later than viral shedding in the throat.

Keep all specimens cold (2-8ºC – wet ice) and transport to the laboratory immediately.

NOTE: UPHL does not regularly accept specimens for mumps testing. However, because the diagnosis of mumps is dependent on laboratory identification, for cases in which patient financial difficulties may preclude testing, UPHL will accept specimens. Culture can be performed free of charge, and serology can be performed for $6.

Treatment:

Supportive.

Case fatality:

Very rare, estimated at 1.6-3.8 deaths per 10,000 infections. More than ½ of the fatalities occur in those over the age of 19.

Reservoir:

Humans.

Transmission:

Mumps is transmitted through droplet nuclei or direct contact with oral secretions. Mumps is a very contagious illness and large outbreaks are known to occur. Hospital infection control should use droplet precautions.

Incubation period:

The incubation period is 14-25 days (average is 16-18).

Period of communicability:

The virus can be isolated from:

- Oral secretions from 7 days before to 9 days after the onset of parotitis.
- Urine from 6 days before to 15 days after the onset of parotitis.

The infectious period is generally defined as ranging from 2 days prior until 5 days after the onset of parotitis.

Susceptibility:

All humans are susceptible. Lifelong immunity develops after clinical (symptomatic or asymptomatic) infections.

Epidemiology:

Mumps is endemic throughout the world. Before the advent of the vaccine in 1967, the peak incidence was between January and May. Since then, there is no observed seasonality in case occurrence. Epidemics tend to occur in closed communities such as boarding schools, ships, and prisons.

Mumps is uncommon in infants under the age of one, due to passively acquired maternal antibody.

Public Health Control Measures

Public health responsibility:

- Promote vaccination to reduce disease burden in the community
- Investigate all new cases of disease and educate patients on how to limit transmission
- Provide education to the general public (regarding disease transmission) and to clinicians (regarding disease diagnosis, reporting, and prevention)
- Monitor disease trends

Prevention:

The primary method of prevention of mumps is through vaccination. The vaccine appears to reduce the risk of infection in 80-90% of vaccinees. Adverse effects to the vaccine are rare. There is only one serotype of the virus; the vaccine is expected to provide protection to all strains. Two doses of the vaccine are felt to be more effective than one dose. The expected duration of immunity is thought to be more than 25 years.

Mumps is a live virus vaccine, and should not be given to pregnant women, or individuals who are immunosuppressed, have advanced malignancies, or are febrile. In addition, vaccine should be administered at least 2 weeks before or at least 3 months after administration of immune globulin (IG) or blood transfusion.

Adult immunization:

- Adults born before or during 1957 do not need to be vaccinated.

- Adults born after 1957 who have only had one dose of MMR may be given another dose at any time.

Healthcare worker immunization:

- Healthcare workers (of any age) who provide direct patient care (face-to-face) should provide evidence of immunity to their worksite. This may include:
    - Evidence of two doses of MMR vaccine, or
    - Serological evidence of immunity.

Note: healthcare facilities may choose to immunize all unimmunized healthcare workers in lieu of requiring serological evidence of immunity.

Child immunization:

- One MMR at 12-15 months of age
- One MMR at 4-6 years of age

Prevention in Healthcare Settings:

There are some simple steps that can be taken to minimize transmission of mumps in a healthcare setting. These include:

- Promote "Ask for a Mask" or similar campaign to reduce exposure in waiting rooms,
- Assure that healthcare workers use droplet precautions (surgical masks, disposable respirators) when providing direct care to known or suspect mumps cases,
- Place surgical masks onto known or suspected cases when transporting them within a facility,
- In settings where the patient is a resident, assure that they only share a room with individuals known to be immune to mumps,
- No special cleaning or disinfection procedures are required for mumps.

Outbreaks:

Because patients are infectious for up to 6 days prior to symptoms and because of the likelihood of asymptomatic infections, the sole use of isolation to curb an outbreak will be ineffective. Effective outbreak management will require vaccination of the susceptible population as well as school exclusion of susceptible individuals.

In the event of a large outbreak (which would be defined through a conference call between UDOH and LHDs), the case management process defined below may be altered, and recommendations on immunization may be expanded.

During an outbreak and depending on the epidemiology of the outbreak (e.g., the age groups and/or institutions involved), a second dose of vaccine should be considered for adults and for children aged 1-4 years who have received 1 dose. In an outbreak setting, 28 days is the recommended interval between MMR doses. In addition, during an outbreak, health-care facilities should strongly consider recommending 2 doses of MMR vaccine to unvaccinated workers born before 1957 who do not have serological evidence of mumps immunity.

Additional means to decrease transmission in outbreak settings include exclusion of persons without evidence of immunity to mumps from institutions such as schools and colleges that are affected by the outbreak. Once vaccinated, students and staff can be readmitted to school immediately, even if they have been exposed to a case of mumps. The period of exclusion for those who remain unvaccinated is 26 days after the onset of parotitis in the last person in the affected institution. Students who acquire mumps illness should be excluded from school until 9 days after the onset of parotitis. After an exposure to mumps, unvaccinated health-care workers without evidence of immunity should be vaccinated and excluded from duty from the 12th day after the first exposure through the 26th day after the last exposure. Health-care workers with mumps illness should be excluded from work until 9 days after the onset of parotitis.

Isolation and quarantine requirements:

Hospitalized cases:
Hospitals should follow droplet precautions for nine days following the onset of parotitis.

School or Daycare:
All students with diagnosed cases of mumps should be excluded from school for nine days following the onset of parotitis.

All exempt or conditionally enrolled students (inadequately vaccinated with MMR) shall be excluded from school from day 12 through day 26 following exposure to a known case of mumps.

R396-100-8. Exclusions of Students Who Are Under Exemption and Conditionally Enrolled Status.
(1) A local or state health department representative may exclude a student who has claimed an exemption or who is conditionally enrolled from school attendance if there is good cause to believe that the student has a vaccine preventable disease and:

(a) has been exposed to a vaccine-preventable disease; or

(b) will be exposed to a vaccine-preventable disease as a result of school attendance.

(2) An excluded student may not attend school until the local health officer is satisfied that a student is no longer at risk of contracting or transmitting a vaccine-preventable disease.

Workplace:
All employees diagnosed with mumps should be excluded from the workplace for 9 days following the onset of parotitis.

Healthcare workers:

Exposed to mumps:

Non-immune healthcare workers who were exposed to mumps should be excluded from direct patient care beginning 12 days until 25 days following the exposure. Facilities may consider permitting workers without symptoms to continue to work, but require that they wear masks and be monitored for symptom development.

Active mumps case:
All healthcare workers who develop mumps should be excluded from work for the full 9 days following onset of parotitis.

Case Investigation

Determine case status

Clinical case definition

An illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting >2 days, and without other apparent cause.

Laboratory criteria for diagnosis

- Positive serologic test for mumps immunoglobulin M (IgM) antibody, or
- Significant rise between acute- and convalescent-phase titers in serum mumps immunoglobulin G (IgG) antibody level by any standard serologic assay, or
- Isolation of mumps virus from clinical specimen, or
- Detection of viral antigen by reverse transcription polymerase chain reaction (RT-PCR)

Confirmed:

A case that is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a confirmed or probable case. A laboratory-confirmed case does not need to meet the clinical case definition.

Probable*:*

A case that meets the clinical case definition, has noncontributory or no serologic or virologic testing, and is not epidemiologically linked to a confirmed or probable case.

Determine onset of symptoms:

Obtain the date of onset of parotitis.

Actions to be taken with the case patient:

Treatment:

There is no treatment for mumps. IG is ineffective.

Isolation:

Patients with mumps should not attend school or work for nine days following the onset of parotitis.

Education:

Patients with mumps should be educated on respiratory etiquette.

Identification and definition of close contacts:

- Determine the infectious period for the subject. This is defined as occurring between 2 days prior until 5 days after the onset of parotitis.
- Close contact exposure is not well defined. We know that mumps is more communicable than pertussis, but less than measles. Close contacts would include household members, students in the same classroom (but not everyone in the school), children in the same daycare room, children who ride the schoolbus, close friends, coworkers who work within 6 feet of the patient, and others who have had close exposure for more than 10 minutes or direct contact with respiratory secretions.
- Healthcare worker exposure would include direct face-to-face contact (where droplet precautions were not followed) for more than 10 minutes with an infectious case or direct contact with respiratory secretions (where contact precautions were not followed).

Case contact management:

- Notify the patient that they have been exposed to a known case of mumps.
- Asked about their history of mumps disease and their vaccine history.
- Offered MMR vaccine if they have not already had 2 doses. The vaccine will provide some protection against subsequent exposures.

References

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December 13, 2006